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STEREOSCOPIC MICROMIRROR DISPLAY

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(56) Prior Art Documents
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CA 2123081
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(57) Claim

1. A stereographic micromirror display consisting of a digital micromirror display with added polarizing filters for the single white light source shining on a digital micromirror device or devices, together with matching polarization eye-filters, so the digital micromirror display can generate two differently polarized images on the same screen, each of which images is visible only to a different eye of the viewer, thereby allowing stereoscopy.

674619

AUSTRALIA
Patents Act 1990

PATENT REQUEST: STANDARD PATENT

I, being the person identified below as the Applicant, request the grant of a patent to myself as the Nominated Person, for an invention described in the accompanying standard complete specification.

Full application details follow.

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[54] Invention Title STEREOSCOPIC MICROMIRROR DISPLAY

[72] Name of actual inventor: JACK NEWMAN
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There are no associated Provisional Applications.
There have been no Basic Convention applications.
There are no drawings recommended to accompany the Abstract.

..... / /
(Signature)

..... /
(Date)

P/00/008a (amended)
Section 29 (1)
Regulation 3.1 (2)

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NOTICE OF ENTITLEMENT

(To be filed before acceptance)

I/~~We~~, JACK NEWMAN

ACN/ARBN .....

of P.O. Box 24, LINDISFARNE, TAS 7015

being the applicant in respect of Application No. , state the following:-

Part 1 - Must be completed FOR ALL APPLICATIONS.

The person(s) nominated for the grant of the patent:

*is / ~~*are~~ the actual inventor(s)

or

~~*has entitlement from the actual inventor(s)~~.....

(eg by assignment, by mesne assignment, as legal representative of ... , etc)

Part 2 - Must be completed IF THE APPLICATION IS ASSOCIATED with one or more PROVISIONAL APPLICATIONS.

The person (s) nominated for the grant of the patent:

*is / *are the applicant(s) of the provisional application(s) listed on the patent request form

or

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(eg by assignment, by agreement, etc)

(Signature)

(Date)

(If the applicant is a Company or other legal entity, also indicate the name and standing of the authorised signatory)

* *Omit/Delete if not appropriate*

Note: Use form P/00/008b where details for PCT, convention priority, microorganism deposit, additional or divisional application, are required.

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COMPLETE SPECIFICATION

STANDARD PATENT

Invention Title: STEREOSCOPIC MICROMIRROR DISPLAY

The following statement is a full description of this invention, including the best method of performing it known to me:

STEREOSCOPIC MICROMIRROR DISPLAY

This invention relates to 3-D or Three-Dimensional display of images from a single screen.

The representation of three-dimensional (3-D) objects requires that slightly different images be presented to the two eyes of the viewer. If these two images are generated on a single screen, they must be separated so each image is seen by only one eye.

As revealed in Scientific American April 1994, page 86, and other places, Texas Instruments has built a high-definition television using one or more arrays of movable micro-mirrors, each of which reflects light from a single light for a period proportional to the brightness required for that colour. The first digital micromirror device was built in 1987 by Larry J. Hornbeck.

My improvement is to add orthogonal polarizations to the light shone on the micromirrors, so the digital micromirror devices can generate two images on the same screen, with the viewer wearing orthogonally polarizing filters so only one image is visible to each eye of the viewer, thereby allowing stereoscopy.

This improvement or extension of the digital micromirror device to stereoscopic display is evidently not obvious, since Texas Instruments did not claim it.

The advantage of this invention over Texas Instruments' prior art is that stereoscopic viewing is possible.

An advantage over other prior art is that the stereoscopic images can be wall-sized, and bright.

An advantage of this invention over the Display Tube Generator [illegible] 59013/94 is that both polarized images are projected onto a single screen, so there is no need for a half-silvered mirror to merge the images, since each polarization uses the same pixels.

In each of the following forms of the invention, the viewer wears eye-filters so that only one polarized image is visible to each eye of the viewer, thereby allowing stereoscopy.

One form of the invention uses a single digital micromirror device with a single white lamp, with a spinning filter in front of it to isolate once per frame each of the six combinations of the two polarizations and three additive colours. As the coloured and polarized light hits the digital micromirror device, each micro-mirror flashes on for a period proportional to the brightness required for that colour and the image corresponding to that polarization.

It is likely that the digital micromirror devices will be mass-produced using a spinning RGB filter in front of a single white light, so another form of the invention uses two of these digital micromirror devices, each with an additional stationary polarizing filter, with the two polarizations orthogonal.

The best form of the invention known to the present inventor uses six digital micromirror devices, each with its own lamp and filter to produce its own unique light: the six lights consist of a pair for each additive primary colour: red (R), green (G), and indigo (B), where one light of each pair is circularly polarized dextrally and the other light is circularly polarized sisitrally, and the eye-filter worn by the viewer over one eye will pass only dextrally circularly polarized light while the other eye-filter will pass only sinistrally circularly polarized light. Each of the six digital micromirror devices is mounted so as to project onto the same screen such that matching pixels are projected onto the same spot on the screen. The screen is opaque, viewed from the same side as the projectors, and has a matte metal surface to preserve the polarization while scattering the light to be seen by viewer. Thus each eye of the viewer sees an independent full-colour image.

The screen may be large, even wall-sized, since the projector light can be much brighter than possible with the cathode ray tubes used in most televisions.

Another form of the invention is as the best form known to the present inventor, but using linearly polarized light (and orthogonal linearly polarizing eye-filters) instead of circularly. This form will be more sensitive to tilting of the viewer's head than is the best form.

The claims defining the invention are as follows:

1. A stereographic micromirror display consisting of a digital micromirror display with added polarizing filters for the single white light source shining on a digital micromirror device or devices, together with matching polarization eye-filters, so the digital micromirror display can generate two differently polarized images on the same screen, each of which images is visible only to a different eye of the viewer, thereby allowing stereoscopy.

2. The stereographic micromirror display of claim 1 wherein the screen has a matte metal surface.

3. The stereographic micromirror display of claim 1 wherein the digital micromirror display contains one or more spinning filters to isolate once per frame each of the six combinations of the two polarizations and three additive colours.

JACK NEWMAN
.....
(Name of Applicant)
(BLOCK LETTERS)

.....
(Date)

ABSTRACT

A colour stereoscopic micromirror display is disclosed consisting of two orthogonal polarizations to the light source shining on digital micromirror device or devices, so the digital micromirror display can generate two orthogonally polarized images on the same screen, together with matching polarization eye-filters so only one image is visible to each eye of the viewer, thereby allowing stereoscopy. The screen should have a matte metal surface. The stereoscopic images can be wall-sized, in full colour and motion, and bright.

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